## REMARKS

Reconsideration of the rejections set forth in the Office Action dated July 26, 2007, is respectfully requested. By this Amendment, the specification has been amended, claims 1-36 have been canceled without prejudice or disclaimer, and new claims 37-52 have been added. Currently, claims 37-52 are pending in this application.

Objection to the drawings

The Examiner objected to the drawings as failing to show DICOM gateway 103. Rather than amend the drawings to show this feature, applicants have submitted herewith an amendment to paragraph 15 to delete reference to reference numeral 103. Specifically, paragraph [0015] has been amended as follows, with underlining showing additions and strikeout being used to show deletions:

[0015] FIG. 1 illustrates an example of a network in which a load balancing service is coupled to a network element to provide load balancing on behalf of a cluster of image archive systems. As illustrated in FIG. 1, one or more imaging modalities 102 are configured to generate medical image data. The imaging modalities may include, without limitation, an x-ray system, a computer tomography system, an ultrasound system, a magnetic resonance imaging system, or a nuclear medicine system. Other modalities may be used and the invention is not limited to these particular modalities. The image modalities 102 may create medical image data in a DICOM compliant image data format, or a non-DICOM compliant image data format. In the event that the image data is in a non-DICOM compliant image data format, a DICOM gateway ~~103 reformats~~ (not shown) may be used to reformat the non-DICOM compliant image data into DICOM compliant image data. The DICOM compliant image data is transferred to a desired destination for storage, processing, or display via a network 104 that is made up of one or more network elements 106. The network ~~106~~ 104 may be an enterprise network, such as a Local Area Network that may be deployed in a medical facility or other facility. Examples of several typical networks may be a Hospital Information System (HIS) or a Radiological Information System (RIS). Alternatively, the network ~~106~~ 104 may be a more extensive network such as a wide area

network ("WAN"), a metro area network ("MAN"), a public network such as the Internet, or other large scale network.

The DICOM gateway was mentioned in this paragraph but not covered in the claims. Hence, this feature of the specification is not believed to be essential for a proper understanding of the disclosed invention. Accordingly, rather than amend the drawings applicants have proposed to amend the specification to cause the specification to be consistent with the drawings as filed. The Examiner is requested to approve this amendment to the specification when acting on this amendment.

Objection to the specification

The Examiner objected to the disclosure because of several minor informalities in paragraphs 15, 18, and 25. Applicants have amended the specification to change the reference numerals as suggested by the Examiner. A marked-up version of paragraph 15 is set forth above. Marked-up versions of paragraphs 18 and 25 are set forth below:

[0018] The network element 106 associated with the network service 112 is preferably a content switch configured to filter data packets to identify particular packets and inspect the identified packets to determine their content. For example, a content switch may monitor the data packet traffic on the network 104 by setting filter values to identify packets on the network 104 that contain a destination address of the image archive system 108. The identified packets may be retrieved from the network ~~206~~ 104 and stored in a memory within network element. The network element may then inspect the retrieved data packets to determine what type of data and/or tasks they contain. The invention is not limited to this embodiment however.

[0025] FIG. 3 depicts a network element according to an embodiment of the present invention. In particular the network element 106 illustrated in FIG. 3 generally includes a processor 302, which includes control logic 304, and a memory 306. The processor 302, control logic 304 and memory 306 provide the functionality and control of the network element 106. The network element 106 also includes one or more network data ports 308 that enable the network element 106 to be connected to the network ~~204~~ 104. A switch fabric 310 under the control of the

processor 302, is provided to interconnect the network data ports 308 and to direct packets therebetween. The switch fabric 310 may be supported by a packet queue 312 that is configured to temporarily store packets or other protocol data units prior to transmission on the network or before being processed by the processor 302.

Claim objections

The Examiner objected to claims 1 and 19 because the term "data" was misspelled as "date". Applicants have re-written the claims rather than amending the original set of claims and have fixed this problem in the newly drafted set of claims.

Rejection under 35 USC 101

Claims 1-9 and 10-18 were rejected under 35 USC 101 because the Examiner felt that these claims did not recite a statutory process. New claim 37 is based on original claim 1 and, accordingly, applicants will address this claim in connection with this rejection.

Claim 37 recites a method for performing network based load balancing of medical image data among a plurality of image archive resources. The preamble recites that the method is performed "by a network service deployed on a network element implemented on the network." Each of the method steps then recite that the method step is performed by the network service. These steps accordingly are clearly not capable of being performed mentally by a human since a human cannot be implemented as a network service deployed on a network element. Accordingly, in view of the re-drafting of the claims, applicants respectfully request that the rejection under 35 USC 101 be withdrawn.

Rejection under 35 USC 112, Second Paragraph

In re-drafting the claims, applicants have attempted to avoid the several issues pointed out by the Examiner in the rejection under 35 USC 112, second paragraph. Accordingly, applicants respectfully request the Examiner to withdraw this rejection.

Rejection under 35 USC 103

Claims 1-9 and 19-27 were rejected under 35 USC 103 as unpatentable over Rothschild (U.S. Patent Application Publication No. 2002/0016718) in view of Primak (U.S. Patent No.

6,389,448), Martin (U.S. Patent No. 6,263,368), and Carr (U.S. Patent No. 6,301,617). The dependent claims not rejected in the primary rejection were likewise rejected under 35 USC 103 as unpatentable over this combination of references in view of additional secondary references. Applicants have canceled all previous claims rendering all of the rejections under 35 USC 103 moot. However, to avoid application of these same combinations of art to the newly drafted claims, applicants will provide a discussion of how the new claims distinguish over these combinations of references. In drafting the claims, new claim 37 roughly corresponds to original independent method claim 1, and new claim 45 roughly corresponds to original independent apparatus claim 19.

Medical imaging modalities may generate one image, a sequence of images, or a very large number of images. These images are frequently very high resolution, and may need to be processed in various ways such as to produce a three-dimensional volume image (Specification at paragraph 4). Frequently, all medical images are required to be handled by one or a small number of medical imaging archive systems such as a Picture Archive and Communication System (PACS), which can form a bottleneck on the network. (Specification at paragraph 5). Accordingly, applicants proposed to deploy a network service on the communication network to perform network-based load balancing of medical image data among a plurality of image archive resources. This enables the network service to monitor the available image archive resources and load balance medical image processing tasks between the available image archive resources based on the complexity of the task required to be performed on the medical images and the available capacity of the image archive resources.

Rothschild teaches a medical image management system that may be implemented by an Application Service Provider to provide network based delivery and storage of medical images. The medical image management system allows users to have access to the medical images securely over the network and provides special clinical and visualization applications centrally for the remote users. (Rothschild at paragraphs 136-140). Rothschild does not teach or suggest a system that intercepts medical images as they are transported across the network and then load-balances the images to image archive resources based on the complexity of the task required to be implemented on the medical images and the available capacity of the various networked image archive resources.

The Examiner cited Primak as teaching a load balancing system. Primak teaches a system in which a client makes a request and the request is transmitted to multiple servers in a server cluster. Each of the servers has a load balancing module and, each time a request arrives, all of the servers will use their load balancing system to generate a connection value for the connection request. (Primak at Col. 2, lines 32-36). The load balancing modules of the various servers within the server cluster communicate with each other to determine which server should accept a particular connection request. (Primak at Col. 2, lines 52-55). Although Primak may discuss load-balancing between servers, Primak does not teach a network service to implement this type of function. Further, Primak does not teach or suggest that the complexity of a task should be factored into the load balancing determination. Finally, Primak does not relate to processing of medical images, but rather is looking at client computers (e.g. personal computers) connecting to a data network to access data on the servers. (Primak at Col. 3, lines 29-39).

The Examiner cited Martin as teaching network load balancing based on the complexity of the task to be performed. Martin teaches that conventional processor load balancing may break down where there is a large amount of data to be transmitted from a server. In this instance, a bottleneck in the system may be the availability of bandwidth on the network rather than processor bandwidth (Martin at col. 2, lines 61-67). Thus, Martin suggest that network server link loading be monitored and used as the basis of performing load balancing between servers (Martin at Col. 3, 36-42).

As support for the Examiner's position, the Examiner cited Martin at Col. 1, lines 41-44 Col. 3, lines 42-48, and Col. 5, lines 14-28. In none of these places does Martin suggest that the load balancer should look at the complexity of the task when selecting a server. In Col. 1, lines 41-44, Martin states that tasks should be distributed equally among the individual server computers to balance the overall loading of the server site to obtain optimum performance. At Col 3, lines 42-48, Martin states that a message traffic monitor is configured to monitor parameters representative of message traffic to and from the servers on the network server links. This reinforces the position outlined above, which is that Martin is looking at the volume of traffic on the network to server links in connection with load balancing. This does not mean that Martin is looking at the complexity of the task to be performed but rather means that he is looking at the amount of traffic on the links connecting the servers to the network.

At Col. 5, lines 14-28, Martin states that client requests are dispatched to servers by looking at "parameters representative of network loading on the server network links. (See Col. 5, lines 24-26). Accordingly, applicants respectfully submit that, contrary to the Examiner's assertion, Martin does not teach or suggest looking at the complexity of the task to be performed when selecting a server to handle a transaction. Rather, Martin teaches that the server should be selected by looking at the amount of traffic on a link connecting the server to the network.

The Examiner cited Carr as teaching that the network service should be configured to extract the task from the medical image data, citing Col. 6, lines 33-37. Carr teaches a way of virtualizing servers by using a virtual uniform resource locator. When a request is received for the virtual uniform resource locator, one of the servers is selected based on the status of the servers. The actual uniform resource locator of the selected server is then returned. (Carr at abstract; Col. 2, lines 31-47).

At Col. 6, lines 33-37 Carr teaches how a computer system, including a processor and a memory, can resolve virtual URLs located in either (1) a browser request; or (2) an HTML file. (See Carr at Col. 6, lines 5-7). In particular, Carr teaches that the decoder decodes instructions, etc. The process being implemented, however, is to locate the virtual URL and then, based on the virtual URL, determine an actual URL of a server to process the request. The system of Carr is not looking within a medical image file to determine a processing task and is not assessing the complexity of the task. Rather, Carr is looking to find a virtual URL within a HTML file or a browser request. Once the virtual URL is located the task to be performed is the same – resolve that URL into an actual URL. Carr does not teach or suggest that a task associated with the request, or that the complexity of the task, should be used in connection with selecting a server to service the request. Rather, Carr is focused on a particular way that a group of servers may be addressed (using a virtual URL) and how the URL may be changed once one of the group of servers is selected.

Thus, there are several aspects not taught or suggested by the combination of references. First, no reference teaches or suggests that the complexity of the task to be performed should be used in connection with selecting a server to service the task. Second, none of the references other than the primary reference has anything to do with medical images or medical image archive resources. Accordingly, applicants respectfully submit that application of a 103 rejection to the newly drafted claims is not warranted.

Conclusion

Applicants have redrafted the claims to focus on the aspects not shown in the combination of references. If the Examiner believes that further amendments are required to overcome the cited references, the Examiner is respectfully requested to call the undersigned to discuss this application. Likewise, if the Examiner has any questions about the cited art or the remarks presented herein, the Examiner is requested to contact the undersigned to discuss this application.

If any fees are due in connection with this filing, the Commissioner is hereby authorized to charge payment of the fees associated with this communication or credit any overpayment to Deposit Account No. 141315 (Ref: 16410BAUS01U).

Respectfully Submitted

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